THE NATIONAL WORK GROUP

ON JUSTICE INFORMATION AND STATISTICS

NWG Document Number 3

Towards Management
Information

GROUPE NATIONAL DE TRAVAIL

SUR L'INFORMATION ET LA STATISTIQUE JUDICIAIRE

NWG Document Number 3

Towards Management Information

Price: $3.00

Prepared by National Work Group
on Justice Information and
Statistics

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March, 1980.

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PREFACE

"Towards Management Information" is one of a series of documents produced by the National Work Group on Justice Information and Statistics (NWG) to improve national justice information and statistics. It brings under one cover a number of initiatives connected with NWG Project 5. At the January, 1979 meeting of the Federal Provincial Advisory Committee on Justice Information and Statistics (FPAC), the NWG was authorized to provide, on request, assistance to any jurisdictions in helping to define their information requirements and to develop a methodology to support this activity. This document seeks to outline the framework needed in developing an information system and the steps identified can serve as a checklist for that process. Auxiliary considerations, such as documentation and security are mentioned, though not discussed exhaustively.

The NWG, principally G. Gervais, J. Johnston, C. Gainer and A. Hourdebaigt, developed a systematic hierarchical methodology which is described in Appendix A. A. Porter, in anticipation of requests for NWG assistance, compiled a framework or list of steps in which this methodology could operate. Section 3.0, outlines some considerations to support the steps of Section 2.0 although it does not purport to be an exhaustive commentary. A. Hourdebaigt provided the documentation standards described in Appendix B to Quebec who are documenting their justice information system with a view of it being a model for other provinces.

The methodology and general approach was used during the Summer of 1979 with the Yukon Territorial Government who had requested NWG assistance in defining their justice requirements. "Towards Management Information" was the subject of a paper presented by A. Porter to the U.S./Canadian Workshop on Corrections Information Systems in September 1979 at Victoria, B.C. G. Gervais also utilized Section 3.4 on Technology Transfer in a paper to the Federal/Provincial Data Dissemination Committee on January 23, 1980 for their annual meeting.

The NWG hopes that this document will prove useful to agencies in the justice field who are developing or assessing their information systems.

The NWG welcome any comments concerning this document and have provided a sheet for that purpose. Any errors or omissions are the responsibility of the author.

ACKNOWLEDGEMENTS

The author would like to thank those who helped in the preparation of this document. The NWG provided resources and the methodology. Special thanks to G. Gervais, NWG Senior Co-ordinator for the incentive to compile this document and to him and C. Gainer of NWG for their criticism and helpful suggestions. Thanks are due to Charles Deschenes, N.B. Department of Justice and Oskar Anderson, Alberta Attorney General who agreed to read the manuscript beforehand. Special thanks is in order for Linda Casey, Ann St-Amour and André Desjardins of NWG for typing, editing and patiently amending this document through its many revisions and translation.

1.0 Introduction

Management is becoming increasingly aware of the need for quantitiative information in order to manage. To obtain, organize and control such information requires some sort of Management Information System (MIS). The Police Management Information Systems Study of the Federal Solicitor General(1) define a MIS as "the process whereby data is collected, stored and retrieved to provide specific information for decision making".

This applies to decision-making at all levels of operations and management. A MIS may require computers, if warranted by cost, timeliness and volume, but this is not necessarily so. Technologies, including computers, are merely the means by which an MIS may operate.

Information in an organization is a resource which may be costly to generate, store, copy, transmit, retrieve and disseminate but it has an impact far in excess of its cost. For an organization "information, like electricity, is a form of energy"(2). It is both necessary and important but there is a need to manage and control it. The MIS is merely the tool by which this management and control of information can be achieved.

The purpose of this technical report is to indicate a means by which an MIS can be attained either from a situation where there is no existing system or where present system(s) do not appear to meet the current needs. The approach advocated here is predicated on the following:

i) Satisfaction of local operational needs by the MIS;

ii) High involvement and control by operational staff, managers and policy analysts in the specification and development of the MIS;

iii) Maintenance of one data base from which all users can derive their data. Generally this means obtaining statistical information for policy planning, research, and national reporting as a by-product of an administrative system;

iv) Utilizing transfer of existing technology wherever possible; and,

v) Planning which involves all relevant parties, with the production of a master plan to guide overall development.

2.0 Steps in Developing an MIS

Certain steps must be taken in an orderly manner to develop a MIS. The ones described here largely are taken from the OBSCIS Implementation Plan(5). For convenience these are grouped into phases:

1. Recognition,
2. Initiation,
3. Review and Evaluation,
4. Overall MIS Design,
5. Detailed Design for Each Module of the Master Plan,
6. Achieving Operational Status.

Each of these phases has provision for management review at its conclusion and, by implication, an opportunity to halt the developmental process if it appears faulty. These phases are further illustrated in Figure 1. Emphasis is on planning and defining requirements before proceeding on a large scale development. It is far easier and cheaper to alter directions before the system is developed rather than afterwards when there will have been large scale expending of resources. Once a system is in place one can be "locked in" to certain concepts, data collection procedures or equipment and it may be difficult to extricate oneself from these.

2.1 Recognition

Senior management must recognize the need for a MIS and this must be impressed on all levels of authority. It will be perceived at this stage that current information systems are not satisfying expected requirements although this lack of satisfaction may not be precisely identified. However, management will feel compelled to initiate some action which may ultimately lead to a new MIS. Action arising from this recognition will result in:

- a broad statement of the perceived problem;
- general terms of reference to be given to a project team or task force. This would include goals, objectives and scope;
- commitment of resources to initiate a MIS development with some indication of the eventual total commitment of resources to this project.

2.2 Initiation

2.2.1 Organize the Project Team

2.2.1.1 Identify a Senior Management Review Committee (Optional). This may be needed if the members of the Steering Committee (Section 2.2.1.2) are not also senior management. This group will be the ultimate authority and make the commitment of resources. Matters not resolved by the Steering Committee will be referred to this body.

FIGURE 1

STEPS IN ADVANCING A MIS

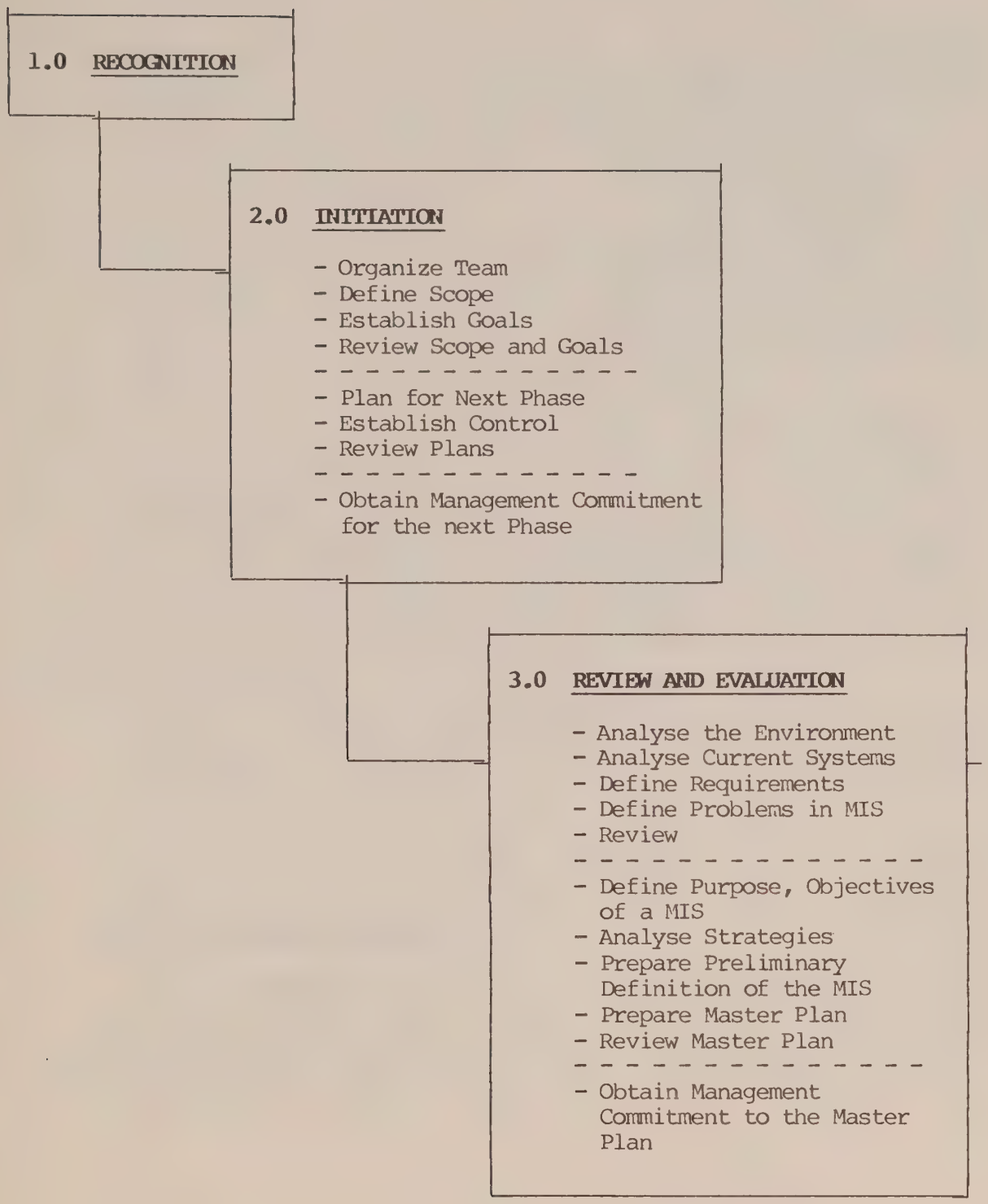
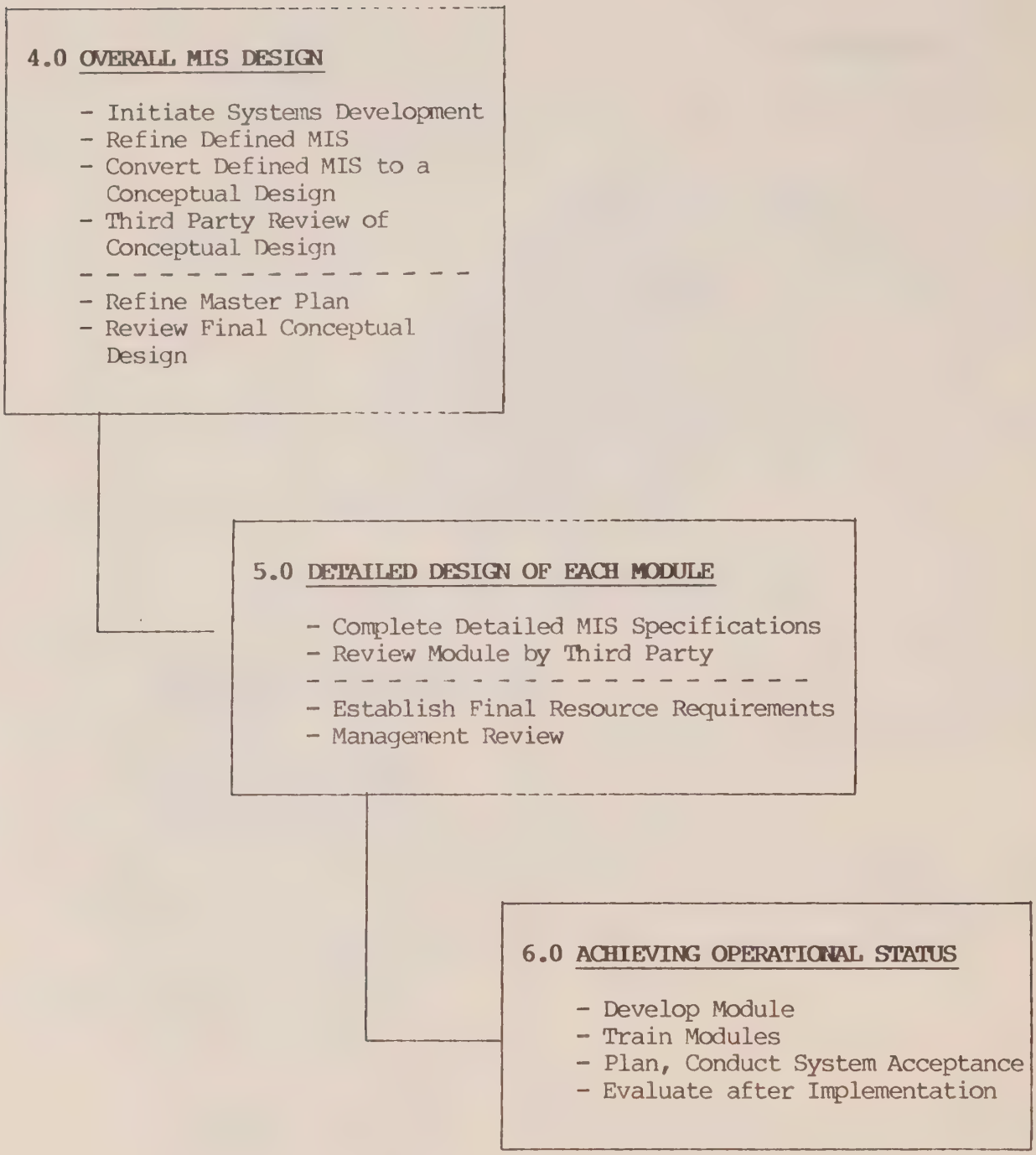


FIGURE 1

STEPS IN ADVANCING A MIS (CONT.)



2.2.1.2 Constitute a Steering Committee. This Steering Committee should have representation from agencies concerned with the MIS. The members should be management that is senior to project team members. This committee will review and monitor work of the project team and try to resolve problems referred to it by the project team.

2.2.1.3 Select Project Manager. This individual will be given terms of reference including his responsibilities and authority. Ideally he should represent the final user of the MIS rather than be a "technical expert" since ultimately the MIS must "belong" to the user.

2.2.1.4 Select Project Team. Identify members with appropriate skills for the team and select the core of the team. These core members must be committed to work during the Initiation Phase. Emphasis should be on the skills rather than status of the members and on the commitment expected. It is best to select members from areas to be directly affected by the MIS.

2.2.1.5 Furnish Team with Initial Terms of Reference. These will include goals and objectives for the team, expected authorities and responsibilities, constraints, management's perception of the problem in information, scope, priorities, and any background material. The team will require this to refine their own perceptions and generate workable definitions of scope, goals and objectives for the project.

2.2.2. Define Scope

2.2.2.1 Review Constraints. These could involve resources, accessibility to information and the legal situation. This should also consider other concurrent developments and anticipated changes.

2.2.2.2 Refine and Detail the Scope of the Project. The project team will use the initial terms of reference to prepare a precise and workable statement of the project scope for review by the Steering Committee. For example the MIS may be defined by management to concern the Canadian Criminal Justice System but its precise definition and bounds may be detailed by the team. The scope will be tempered by what the team perceives is realistic in view of constraints, terms of reference and the capacities of the team.

2.2.3 Establish Goals for the Management Information System (MIS)

The team interprets and details the goals in the Initial Terms of Reference to prepare a workable set of goals and objectives suitable for presentation to the Steering Committee. These should include:

- type of information expected from the MIS,
- timeliness requirements,
- possible methods of supplying information,
- key operational functions and perceived problem areas,
- possible links with other MIS's.

These goals should be measurable and allow one to determine when the MIS has been achieved.

2.2.4 Review Scope and Goals by Management

2.2.4.1 Review Scope. Management ensures its intentions are included in the scope and extraneous functions are not included.

2.2.4.2 Mutually Agree on Scope by Team and Management. The Steering Committee and the Project Team will arrive at an agreed-upon version of the scope of the project and commit themselves to it.

2.2.4.3 Review Project Goals. Management ensures that its intentions are defined, understood and included in the goals and objectives as produced by the team. All extraneous goals should be deleted and all constraints should have been considered. All goals should be challenged for reasonableness and achievability.

2.2.4.4 Mutually Agree on Goals by Team and Management. The Steering Committee and Project Team will arrive at a agreed-upon version of the goals for the project and commit themselves to these.

2.2.4.5 Set Priorities. Management will set priorities on the goals of the project.

2.2.5 Develop a Plan for the Review and Evaluation

2.2.5.1 Determine Activities Required to do the Review and Evaluation. These include identifying personnel and obtaining documentation which may help describe the current status, environment (relevant legislation, policies, directives), current information, needs. The methodology and approach to performing a review and evaluation will be selected along with instruments to perform it. Each activity will be broken down into small identifiable tasks for purposes of scheduling, identifying resources and assigning responsibility.

2.2.5.2 Schedule Tasks. This scheduling involves estimating both the elapsed time and resources required for each task as well as any logical sequencing of tasks. The schedule will be subject to the availability of personnel to be interviewed and other external factors as well as uncertainty in the estimates themselves. Thus the schedule should have some contingency built into it so that the final product of the review and evaluation exercise, a master plan for the MIS, can be produced on schedule and within budget. Each task should show the person responsible for its completion.

2.2.5.3 Estimate Costs. The cost of performing the review and evaluation can be developed from estimates for each step. These costs should include internal personnel with overhead as well as services, material and travel. In approving the plan for the review and evaluation, management will be committing itself to expending these resources.

2.2.6 Establish Methods of Project Control and Management Review

2.2.6.1 Refine Reporting Structure. This will utilize the terms of reference to prepare a detailed and more precise description of reporting structure to be expected during both the review and evaluation phases and include a schedule of review meetings.

2.2.6.2 Identify Progress Reports. The team will propose the types of progress reports to be sent to management. These will include regular reports, milestone reports and other special reports as well as the timing and content of such reports.

2.2.7 Review Plans by Management

2.2.7.1 Check on Reasonableness of Plan. The Steering Committee will review the plan to check if:

- identified tasks are necessary and sufficient,
- cost and time estimates are reasonable,
- resources can be available when needed,
- outside personnel to be interviewed will be available when scheduled.

2.2.7.2 Determine if Plan Fulfills Objectives of Review and Evaluation Phase. Management will satisfy itself that the planned work is going to achieve the agreed-upon goals and that the investigations cover the scope of the study.

2.2.7.3 **Mutually Agree Upon Reporting Structure and Methods.** The Steering Committee will review the proposed reporting structure and schedule of reporting as well as its contents and amend them to suit their needs. This reporting will be used during the Review and Evaluation Phase and may be extended to encompass further phases and thus becomes part of the plan.

2.2.8 **Obtain Senior Management Acceptance and Commitment for the Review and Evaluation.**

2.2.8.1 **Steering Committee Accepts Plan and Commits Resources.** The Steering Committee, based on its review, will accept the plan for the Review and Evaluation or reject it. If accepted, it will ensure that resources will be available to carry out this phase.

2.2.8.2 **Senior Management Review Committee Approves Plan (Optional).** If there is a Senior Management Committee it will approve or disapprove the plan. If approved, it will commit resources and ensure organizational commitment to this phase. This should guarantee cooperation in the interviewing and obtaining of information which must necessarily occur during the review and evaluation. If members of the Steering Committee are senior management they will have done this.

2.3 Review and Evaluation

2.3.1 Analyse the Environment for the MIS.

2.3.1.1 **Analyse the Organization.** The team will obtain information on the organizations which will be involved with the MIS. This may be formal organization charts supplemented with statements concerning the goals and objectives of the organizations, legal mandate, (where applicable), responsibilities, authorities, job descriptions, and present and future resources. Such background material can help identify the organization's services, responsibility/authority balance, stresses, public accountability and responsiveness. The decisions, tasks, activities, functions and authority structure of an organization help define its information needs.

2.3.1.2 **Identify Environmental Constraints.** These contraints relate to external factors such as legislation, geography, population to be served, economic conditions, experience, practices and traditions. Such constraints may have a major bearing on what can be possible in a master plan for an MIS. For example strong pressure groups and a general distrust of government could prevent integrating health and justice information on individuals. Budget limitations for the development and operation of an MIS must be understood as well as the capacities of personnel and the availability of other

resources. It would be folly to propose a high technology MIS to an organization with no computing background and no budget to get into it.

The identification of environmental constraints will aid in identifying and defining problems affecting the speed, thoroughness, efficiency and quality of administrative processes. This background is necessary to determine the basic or core problems concerning information.

2.3.2 Analyse Current Information Systems (Present Status)

2.3.2.1 Define Current Manual and Automated Systems. This involves collecting all documentation and interviewing where possible those who designed and those who now operate the system. It is critical to identify operational procedures which have evolved beyond the existing documentation. Individuals' perceptions of the systems may be as valuable as actual "facts" determined from documentation, reports, etc. Determining how individuals interact with the various operations will provide insight into the human processes affecting systems functions. It will be important to establish a glossary of terms so there is common understanding. The definition of the systems and procedures will identify:

- files and data elements,
- reports produced (contents, frequency and distribution and the use made of these reports),
- source and mode of input data (reliability, content, frequency, volume),
- controls to ensure integrity of the data, including all editing and follow-up procedures,
- clerical work to support the system,
- access to files,
- security, privacy and confidentiality of data,
- organization responsible,
- other organizations which interface with the system and data linkages.

A flow chart illustrating the decision-making processes will aid in portraying present systems. The output from these current systems gives the current supply of information.

2.3.2.2 Identify Resources Supporting Existing Systems. These resources include manpower (numbers, levels of skills), equipment (Electronic Data Processing and manual) and their respective costs. With respect to equipment, the excess capacity should be identified. This excess capacity of equipment and the staff can determine limits to growth of the present systems and it can also be assessed with respect to use with any proposed MIS.

2.3.2.3 Determine Future Plans. This involves investigating plans for new systems or modifications to present ones and will include changes in manpower resources and equipment facilities. The main purpose of this step is to ensure that the analysis of the present status is not obsolete before it is done and to understand how these planned changes could impact on a new MIS.

2.3.2.4 Assemble Documentation and Review. This may merely be a formalizing of existing documentation but it should be reviewed with present systems personnel as future decisions may be based on this documentation. It may be necessary to revise some documentation in light of information obtained in Section 2.3.2.1.

2.3.2.5 Consolidate User Statements about the System. In the process of reviewing existing systems and procedures, the users may expose various problems with the system and some suggestions for improvement. This analysis of the current system may afford the user an opportunity of making his views known.

2.3.3 Define Requirements

2.3.3.1 Determine the Organization's Demand for Information. This exercise will define who in the organization needs what kind of information for what purpose and how frequently. The information needed will be described in terms of reports and data elements withtheir precision, accuracy, frequency, timeliness, and importance. An instrument for systematically defining the organization's demand has been developed by the National Work Group on Justice Information and Statistics (NWG) and is described in Appendix A. A complete determination of the demand for information will include the needs of outside users.

2.3.3.2 Analyse the Demand. This exercise will utilize information gathered in the previous step to identify and eliminate duplications in definitions and seek common definitions. This step may not be fully realized but should have been well-initiated with its eventual completion forming part of the Master Plan.

2.3.4 Define Problems in the MIS.

2.3.4.1 Compare Requirements with Existing Information. All requirements for information are most likely not being met by current systems. These shortcomings of the present systems would most likely be in the areas of accessibility of data, completeness of data, and reporting capabilities. Other problems may be that the resources required for current systems do not seem justified in terms of information produced. This comparison should result in a concise report to management showing the needs which are not being met by current information systems.

2.3.4.2 Analyse Organizational Problems. Some difficulties in satisfying information needs may highlight organizational problems. These include policies and procedures which impact on data processing, controls, auditing features and organizational aspects of data processing. Such problems would be addressed by management.

2.3.5 Review Requirements by Management

2.3.5.1 Check that Requirements are Complete and Correct. From the perspective of the Steering Committee the totality of the requirements can be assessed for completeness and correctness with respect to organizational needs. It affords an opportunity to evaluate the information being produced in light of what is desirable.

2.3.5.2 Set Priorities. The Steering Committee will set the priorities on information requirements. These will govern how the master plan is constructed and represent management input to the process.

2.3.6 Define Purpose and Objectives of the MIS

2.3.6.1 Determine the Information Problem. The Project Team will analyse the information presently produced with respect to the scope and goals defined during the Initiation Phase and with respect to requirements identified. Such an analysis will show which information needs are not being satisfied by current systems and procedures and this comprises the information problem. The costs of operating present systems should also be considered as these may be too high and suggest the need for more economical means of processing.

The definition of the problem will also focus on:

- accessibility of data,
- completeness of data processing and reporting procedures,
- statistical reporting capabilities,
- policies and procedures,
- control and auditing,
- organization.

2.3.6.2 Set Objectives for a MIS. The Project Team will formulate a set of objectives for an MIS based on the requirements, constraints, general objectives and scope. Such a statement will form the basis of the definition of a MIS.

2.3.7 Analyze Strategies to Meet Objectives

2.3.7.1 Review Other MIS's. The Project Team will review other systems and approaches which appear to respond to similar information problems as set forth for this MIS (See Section 2.3.6.). This review could include literature of other systems, visits to examine systems under operation, documentation on packages, and reports of MIS's in other organizations. This review will identify discernable overall alternative strategies and, for each, the costs of development and operation will be estimated and its advantages and disadvantages listed.

2.3.7.2 Select Favoured Strategies. The Project Team will select the more favoured alternative strategies that are also feasible and prepare them for a decision by the Steering Committee. There should be at least two alternatives but not a plethora although background material indicating the full range of alternatives should be presented in such a way that the Steering Committee can be aware of them. The presentation will indicate costs, advantages and disadvantages and suggest tangible benefits which one or the other can achieve. These strategies refer to overall approaches to developing a MIS (e.g. manual, batch computer, on-line system) rather than details which will be decided later.

2.3.7.3 Choose a Strategy. The Steering Committee will choose one of the alternatives presented. This committee will satisfy itself that the alternative chosen will meet the objectives of the MIS within the constraints. Perhaps no alternative will appear satisfactory so it may be necessary to search for other strategies, change the constraints e.g. seek more resources, or abandon the exercise.

2.3.8 Prepare Preliminary Definition of the MIS

2.3.8.1 Identify Data Elements. The project team will prepare a list of data elements to be carried in the MIS. This will include the common definition and a specification of coding. The data elements may be needed for their own intrinsic value, record identification, or linkage to other MIS's.

2.3.8.2 Define Required Outputs and Inputs. The outputs represent information needed by users and could be reports, enquiries, notices and expected future requirements. Outputs should be defined in terms of volume, content, frequency, distribution and media. Inputs represent the information being put into the MIS. They should be defined in terms of content, frequency, quality, method of collection and source.

2.3.8.3 Define Functions to be Performed by MIS. This will indicate what is to be done to the information in the areas of updating, editing, security and integrity, and retrieval of the data.

2.3.8.4 Compile Preliminary Definition of the MIS. This will be done by the Project Team from the foregoing and presented to the Steering Committee for approval.

2.3.9 Prepare Master Plan to Achieve the MIS

A comprehensive master plan for information brings together the supply of information (current information and its availability) and the demand (requirements by the organization for information). It represents a "front-end investment" in planning for the development of a MIS. Having such a "front-end" will address the requirements and not simply make the current supplying of information more efficient.

The master plan will serve as a framework for future development of a MIS. It will be the culmination of the previous activities.

2.3.9.1 Assemble Background Documentation. The Master Plan will be a comprehensive package indicating not only the overall plan but background information for completeness. The package will include:

a) Scope and Goals for the MIS (Section 2.2.4),
b) Methods of Project Control and Management Review (Section 2.2.6),
c) Set of Requirements (Section 2.3.3),
d) Purpose and Objectives of the MIS (Section 2.3.6),
e) Preliminary Definition of the MIS (Section 2.3.8).

2.3.9.2 Define Overall Strategy for Development. This will outline the overall strategy in the master plan and include some discussion of alternatives considered (Section 2.3.7). If computer hardware is part of the strategy a broad definition of the hardware required will be included. Out of this can result the overall system design to identify major components.

2.3.9.3 Develop a Schedule. Major steps and milestones in the development strategy will be identified. These will be scheduled taking due cognizance of specific development priorities. A staffing plan and an expenditure schedule will be necessary supporting information.

2.3.9.4 Estimate Costs. The developmental and operational costs will be estimated. These will include personnel, hardware (if relevant) and services.

2.3.10 Review Master Plan by Management

2.3.10.1 Confirm Master Plan is within Scope and Goals. The Steering Committee will ensure that the Master Plan, as presented, is within the scope and answers to the purpose and goals set for the MIS.

2.3.10.2 Approve Master Plan. The Steering Committee will either approve the plan, modify it or reject it entirely. At this stage it is relatively inexpensive to change basic approaches but once the plan is accepted and commitments are made it can be very expensive to change fundamentals. The Steering Committee may also have to procure extra resources to carry out implementation of the Master Plan.

2.3.11 Obtain Senior Management Acceptance of and Commitment to the Master Plan.

Senior Management will approve and accept the Master Plan as the blueprint for the development of an information system throughout the organization and ensure sufficient resources are committed to it. This Master Plan can also lead to great changes within the organization so that its successful implementation will only be possible if the entire organization understands senior management's support and commitment.

2.4 Overall MIS Design

2.4.1 Initiate the Systems Development

2.4.1.1. Develop an Organization. This involves forming and staffing an organization for developing the system and then one for operating it. The Project Team for development may be quite different from the one used during the Review and Evaluation Phase. For the group(s) charged with developing and operating the system it will be necessary to:

- define various jobs and develop job descriptions,
- develop policies,
- define training,
- staff defined positions.

2.4.1.2 Develop Standards. Standards will be required during the development of the system which will include design conventions, controls, and format of required documentation. It may be possible to adapt existing standards but these must be explicitly stated, known and adhered to by the development team.

2.4.2 Refine the Defined MIS

2.4.2.1. Finalize Detailed Requirements of the MIS. The project team can return to the users with a mandate from Senior Management to design a MIS under an accepted Master Plan. At this point the composition of the team may be changed from one equipped to study systems and produce the Master Plan to one which will be charged with carrying out that Master Plan by developing systems. The team can then review requirements and obtain more detail regarding inputs, outputs, functions required and constraints. This will enable the project team to produce a more detailed definition of the MIS although this definition will still be expressed at a non-technical level. It will represent a functional description of the MIS stating what the MIS will do and be.

2.4.2.2. Approve Finalized Definition of the MIS. The Steering Committee will approve this finalized description. This description will be the basis for systems specifications.

2.4.3 Convert the Defined MIS into a Conceptual Design

2.4.3.1 Produce an Overall System Design. The Project Team will cause an overall systems design to be produced either in-house or under contract. Such a design will consider modularity, mode of processing (manual, on-line or batch computing), overall file structure, processing flows, interfaces, inputs, and outputs. It will also address security, control and how the new system will impact on current operations. This conceptual systems design describes how the system will work. It will be best in designing the system to work backwards from the desired outputs.

2.4.3.2 Prepare Narrative of the Design. The narrative will describe how the system will operate and what functions it will perform. It will provide an overview of the conceptual systems design and provide a rationale for options chosen.

2.4.4 Review Conceptual Design Objectively by a Third Party

The main purpose of such a review is to establish that the conceptual systems design answers to the approved definition of the MIS (Section 2.4.2). Auxiliary jpurposes would be to ensure that the design is technically feasible and that, given the constraints, the best design options are considered and the optimum approach is used. This review will be presented to the Project Team.

2.4.5 Refine the Master Plan

2.4.5.1 Review Estimates. In light of the conceptual design, resource estimates will be reviewed and adjusted as needed.

2.4.5.2 Refine Schedule. It will be possible to refine the work scheduled and make the milestones more precise with firmer dates. If the MIS development is to be modular, each module should be clearly identified in the revised schedule.

2.4.6 Review of the Conceptual Systems Design by User and Management

2.4.6.1 Present Conceptual Systems Design to the User. The users will have an opportunity to review the conceptual design and cause modifications to be made. The Project Team will seek the users' concurrence and commitment for future cooperation during development and implementation. Having the conceptual design allows a clearer indication of how the MIS will impact.

2.4.6.2 Review Refined Plan. The Steering Committee will review the revised schedule, resource requirements and costs. They will ensure resources can be made available. If there are major differences from the approved Master Plan these should be submitted to Senior Management for acceptance and commitment. This step affords an opportunity to halt development of the MIS before it begins as its implications on the organization are now clearer.

2.5 Detailed Design for Each Module of Master Plan

2.5.1 Complete Detailed MIS Specifications

2.5.1.1 Depict Outputs. All outputs from the system module will be identified in terms of content and medium. For reports indicate data location in the report, content, sequence, totals, controls and page separations. Similarly for on-line video screen displays make screen layouts. For files passed to other modules the format, contents and documentation should be produced. All of these will be done in conjunction with the user and each should be signed off. The frequency, volume and distribution of outputs will also be considered.

2.5.1.2 Identify Processing Steps. This will describe what each major processing function will do. If the function is to be done on computer these will serve as program definitions.

2.5.1.3 Design the Data Base. The data base consists of those elements required for this module. The design involves defining the data elements and collecting them into logical records. Besides details on the data elements such as size, mode, description and purpose, it is necessary to include security, privacy and policy considerations.

2.5.1.4 Define Inputs. Define or obtain details concerning inputs to this system module. This will include the media, frequency, volume, source and contents. Any input forms should be signed off at this stage. The input will be separated into logical transactions.

2.5.1.5 Diagram the Flow of Data. This will be a chart depicting the flow of data through the system and it will be a means of communication of ideas between user and technical staff. It will break down the processing into major functions.

2.5.2 Review System Module Objectively by a Third Party.

If possible, an objective third party should review what was produced in Section 2.5.1 to refine the conceptual system design and advise the project manager on the quality of system he is obtaining. The result of this review may be a revision of the conceptual design.

2.5.3 Establish Final Resource Requirements.

The detailed design of the module will enable more accurate estimates of resource requirements both for development and operation. Development would include hardware (computers, communications, etc.), software (programs purchased or developed) and operating procedures. Based upon input, output and processing volumes the costs of operating the system can be accurately estimated.

2.5.3.1 Refine Work Plan and Schedule. In view of the resource requirements established and the detailed design of the module the plan and schedule can be refined. At this stage commitments of technical support can be finalized.

2.5.3.2 Establish Final Estimates (Development and Operating Costs). With the refined work plan and resource requirements all cost estimates can be finalized. If the estimated cost is substantially more than the original estimate, development should not commence until the reason is determined and any necessary corrective action taken by the Steering Committee.

2.5.4 Perform Management Review

The Steering Committee will review the systems module in light of the detailed design, its review by a third party and the final estimates. Such a review will allow a sign-off by all concerned. This will also signal the procurement of staff and equipment.

2.6 Achieving Operational Status

2.6.1 Develop System or MIS Module

The Project Team is now concerned with the development effort. If the system is manual these activities consist of the development of procedures only, while an automated system would require programming as well. Both involve the review and finalization of the conceptual systems design as approved in Section 2.5.4. An important part of this task will be to apply all programming and operational standards and establish management control. Programs and procedures will be developed and tested internally with program and operational documentation being prepared at the same time.

2.6.2 Complete User Training

2.6.2.1 Plan Training. Planning for user training can begin in earnest once the conceptual design and schedule has been established. This planning will identify personnel, materials and content of the training. User involvement in performing the training is preferable.

2.6.2.2 Conduct Training. The user training will require the preparation of all operating and control procedures. Training should also cover the responsibilities of users with respect to the system. This user training can only occur after detailed procedures for users have been developed and for best effect should occur just prior to the training being applied.

2.6.3 Plan and Conduct the System Acceptance

Once the conceptual system design is approved the systems test can be planned. It will require extensive test data and thus must be allocated sufficient resources. This test is the responsibility of the user who should prepare test data using any technical assistance necessary. The expected output must also be determined before actually running the test. Technical staff will aid in running the test and rectifying discrepancies as soon as possible. The final systems test data should be retained for use during future systems' modifications.

2.6.4 Plan and Perform System Conversion and Implementation.

2.6.4.1 Convert system. This will be necessary where there currently exists a system (manual or automated) which will be superseded by the new module. It may be desirable to do parallel processing if that is feasible. Files may have to be converted and new ones created. There must be controls to assure the integrity of these converted files.

Ideally both old and new systems should be run for the same processing cycle and outputs compared.

2.6.4.2 Perform Final Implementation. The system will be turned over to operating personnel and function in the operating evironment. This turnover will include a operating documentation, processing and date retention schedules. Some technical support may be necessary during the early stages of the implementation and prompt response to startup problems will increase the credibility of the system with the user.

2.6.5 Evaluate Module after Implementation.

This evaluation should occur 6-12 months after implementation. It will examine if the system appears to be meeting its goals and recommend any changes to improve this. A few month's successful operation can give accurate costs for operating the system. A by-product of this evaluation may be the lessons it teaches which can be applied to future projects and such information should be documented and distributed widely.

The evaluation should be considered a necessary step and the development cannot be considered complete until this evaluation has been done.

3.0 Considerations

In taking steps to achieve an MIS it will be necessary to consider how some of these steps can be taken. For example it is well and good to specify that documentation should be produced but what documentation? This and some other such considerations are addressed in the following sub-sections although these should not be considered as all the possible considerations nor an exhaustive discussion on any one of them.

3.1 A Methodology to Obtain Information Requirements

Ascertaining what is required for a MIS is not a trivial task nor necessarily an easy one. It requires the full participation of the user and the onus is on him to clearly articulate what is required. It is only after this task has been done that the MIS can be defined, designed, implemented and evaluated. There are many methodologies for determining information requirements and these range in sophistication from a few casual interviews to comprehensive systems to determine requirements. A review of such systems and a bibliography is given by Taggart and Tharp (13).

A method developed and tested by NWG is described in Appendix A. It consists in determining the organizational hierarchy (i.e. program classification structure) and, for each activity identified in the hierarchy, the information and thence data elements required. In addition there are provisions for entering definitions for terms at every level. A turnaround document is provided to enable a potential user to utilize the stated requirements of another user to help build up his own.

3.2 Security, Privacy and Confidentiality

The terms security, privacy and confidentiality are often lumped together and, unfortunately thought of, as part of the same lump. For purposes of discussion they will be defined here as:

(i) Security: The protection of resources (including data and programs) from accidental or malicious modification, destruction or disclosure. (10)

(ii) Privacy: In an informational context it is the social expectation that the individual will have some:

- say on how information about him is used, to whom it is communicated, and how it influences him;
- protection against unwarranted harm because of the functioning of some record keeping system and be treated fairly by such systems;
- protection against unwelcome, unfair, or intrusive collection of information. (11)

This is predicated on the individual "owning" information about himself and having some say in its use.

(iii) Confidentiality: An attribute of the information which describes the desired level of accessibility.

Security itself can be broken down into components such as:

a) System Security. The state of a computer system (hardware and software) that makes it possible to provide reasonable assurances of security. System security presupposes that appropriate steps are taken for physical protection of the computer, for operating and maintaining the system, and for identification and authentication of users of the system. (10)

b) Data Security. The protection of the data from disclosure or loss of integrity.

The advent of large scale data banks with personal data, advances in computer technology which provide the means to more easily access these data banks, and an increase in public sensitivity to concerns about security, privacy, and confidentiality conspire to render these as very important considerations in any MIS. Therefore the concepts and design of an MIS must consider very early in the planning the required degrees of security, privacy and confidentiality and build these into the design. Within the planning framework of this paper these considerations should be recognized and defined early in the Review and Evaluation Phase (Section 2.3).

To accommodate these considerations after the Detailed Design Phase (Section 2.5) may prove to be very expensive, awkward or simply impossible.

It is not the intention of this section to thoroughly discuss security, privacy, and confidentiality but to acknowledge its importance and place in achieving an MIS. The reader is referred to the recent report to BC Attorney General and BC Systems Corporation by Dennis Hartman (11) for a thorough discussion on privacy. Search Group Inc. has recently published a bibliography on these subjects (12).

3.3 Documentation

3.3.1 Purpose

Documentation for a system is necessary to:

- Respond to user requirements by describing how a system meets their objectives;
- Give general and then specific details on what the system does and how it does it so that the user can judge its output;

- Specify how to operate the system;
- Assess whether the system (developed locally or obtained by transfer) can be accepted;
- Provide sufficient detail to maintain the system (i.e. correct errors, enhance, change due to external circumstances);
- Estimate cost of operation and maintenance;
- Transfer the system to other users.

Documentation for any system is recognized as being extremely important but it is all too often incomplete and inadequate for what is needed. With respect to computer systems the developpers are often loathe to fully document what has been produced and would rather go on to new problems and assignments. Therefore in developing any system it is important that documentation standards be established early and then enforced. Documentation which is produced almost concurrently with the systems development is preferred since it is easier to produce this way and standards are more likely to be enforced.

3.3.2 Areas of Interest

The documentation for any system should address the following areas of interest:

(i) System Overview. This allows the reader to gain a global understanding of what the system is, generally the approach behind how it operates and the relationship of its components and files.

(ii) Data (Input, Output, Internal Files). This explains in detail the definition, coding, data concepts of data elements and their organization into files. The volume, frequency and file medium is addressed and outputs depicted in some detail. If a data base management system (DBMS) is part of the system its schema (i.e. organization) and other attributes should be described.

(iii) Detailed Description. This would include detailed descriptions of modules and sufficient information to allow installation of the system and its maintenance (correcting errors, enhancing, customizing).

(iv) Operations Documentation. This should furnish the user with the instructions on how to operate the system. As well, a user guide will show how to interact with the system and use it to advantage.

(v) Other Considerations. These include security, privacy, and confidentiality provisions of the system. Other particular features would concern the system's transferability and systems support (especially if it is supplied externally).

3.3.3 Documents

There are no universal standards for documentation but, as pointed out in Section 2.4.1.2, standards for documentation for the development of a MIS should be established before the system development begins and then these must be enforced. The format and organization of systems documentation will therefore vary but a well documented system should contain the following pieces:

- System Overview,
- Flow Charts - general and specific,
- System and Program Descriptions,
- Program Listings (not necessary if programs are maintained externally),
- Record Layouts or Schema for all files,
- Data Concepts and Definitions,
- Operations Manual for running the system,
- Log Books and other record keeping devices to operate the system in production,
- Users' Manual on how to use the system.

NWG assembled some specifications concerning system documentation and these are shown in Appendix B.

3.4 Technology Transfer

3.4.1 Introduction

While the cost of electronics and thus computer hardware has been falling, the cost of manpower and thus the cost of programming or computer software has been rising. These trends can be expected to continue so that computer software is becoming an increasingly expensive commodity. However, much computer software has been developed in recent years to address the area of justice systems and this can be shared. This effort has resulted in several well-documented systems and also in some systems, features especially designed to facilitate systems transfer.

Because of these trends and the availability of transportable systems, the transfer of technology to develop any MIS must be seriously considered. In fact a smaller agency cannot hope to completely devise its own MIS alone because of the high cost of doing this and the scarcity of knowledgeable people. One is always tempted to state that one's own requirements and environment are too "unique" to use the work of others. It is easy to adopt an "NIH" (Not Invented Here) attitude, an affliction particularly prevalent among systems and programming people.

The transfer of technology should be encouraged for the following reasons:

(a) **Increasing costs.** These result from higher wages, increased complexity of problems, higher expectations of users, increased scale of problems and a higher sophistication possible in computer science.

(b) **Higher rate of change in society.** It is hard to justify development projects which would extend more than 2 years. Technology transfer is one means to speed up development.

(c) **Possibility of greater perspective.** Technology transfer increases the number of perspectives and different ideas which can be brought to bear on a problem. The very act of seeking outside technical solutions may broaden the outlook on the problem and steer one clear of excessively complex solutions that may be concocted in splendid isolation.

(d) **Compatability.** Transfer of technology can result in more compatible systems and greater ease in exchanging information produced from these systems. Similarity in systems also can result in mutual backup in case of problems.

3.4.2 What is Technology Transfer?

Technology transfer can occur at 3 levels:

(a) **Conceptual.** Concepts or ideas are transferred although their implementation may differ. Examples in the Justice area could be having information based on the offender in corrections, the use of UCR offence classification in various police information systems.

(b) **Design.** Specifications and procedures for a system could be transferred but not computer programs. The OBSICS model for Corrections is an example of this type of transfer wherein the procedure, data elements, specifications for modules are transferred.

(c) **Operational.** Actual computer systems are transferred. This would include software and detailed procedures.

Technology transfer has been effected at all levels but the transfer gets progressively more involved as one goes from (a) to (c). For example much more documentation from the donor and much more learning by the recipient is required for a (c)-type rather than an (a) type transfer.

Transfer can be done by:

- accepting something free,
- borrowing,
- bartering,
- renting,
- buying,
- or even stealing.

Seldom is anything ever totally "free of charge" including fresh air so that technology borrowed, or transferred free of charge, or stolen will still cost the user time to adapt. It will undoubtedly carry the caveat "user beware" and it will be the user's problem to make it work.

Bartering puts the user in a slightly stronger position in that he can support and assist in the technology he has given in exchange for similar support for what he has received.

Renting technology can free the user of much of the effort in implementing and maintaining the technology transferred The user can avail himself of the enhancements as they occur. However, this may lead the user to external dependencies which may not be acceptable. It may be difficult to tailor the technology acquired in this way to the user's particular needs. Dependence on the lessor to provide the technology may lead to internal developmental stagnation.

Buying technology can allow the user to shop, compare and demand the technology he wishes. However, the greater the amount of customizing demanded the higher the cost. Once the technology is acquired the user may choose to have it maintained by the vendor with possibly undesirable external dependencies or build up internal expertise. Either way there is a continuing cost which should also be considered in addition to the purchase price.

For a user to be in control of the technology transferred him, he must acquire a depth of knowledge up to the level of the technology transfer. For example if the design is being transferred the user must understand the concepts underlying it, if it is an operational technology transfer the user must understand the design considerations. Although there are benefits in this transfer process, it is not magical and cannot be viewed as a black box which will, unaided, answer to the needs.

3.4.3 Benefits of Technology Transfer

The most compelling reason to consider technology transfer is its potential saving for the cost of development. In 1976 the LEAA attempted operational technology transfer for six sites (6) and the following table is an estimate of potential savings which can be realized in the justice environment.

Savings

Types of Costs	Type of Transfer		
	Operational	Design	Concept
Design	80%	65-75%	20-40%
Coding/Testing	75-95%	25%	0
Documentation	80-90%	50%	15%
Maintenance	80%	0	0

Obviously an operational transfer has greater potential for saving especially in coding the software. However, it requires more learning by the user, and a more involved transfer process as well as more adaptation by the user to the technology being received. In contrast the conceptual transfer could be done simply by reading some documents and,interestingly enough, there are possible savings here.

3.4.4 Conditions for Technology Transfer

Tasks involved in technology transfer are shown in Figure 2. This procedure is geared particularly to transfer at the operational level but it could apply to technology transfer at other levels. Implicit in the technology transfer process is adequate planning and a sufficient requirements analysis. Especially with operational technology transfer there should be a user group at the beginning to be responsible for these tasks and one should count on heavy user involvement in this process. It is necessary to fully identify and clarify all constraints (political, environmental and technical), in order to be able to identify feasible technology transfer. Without adequate documentation effective transfer will be impossible so this too is a necessary prerequisite.

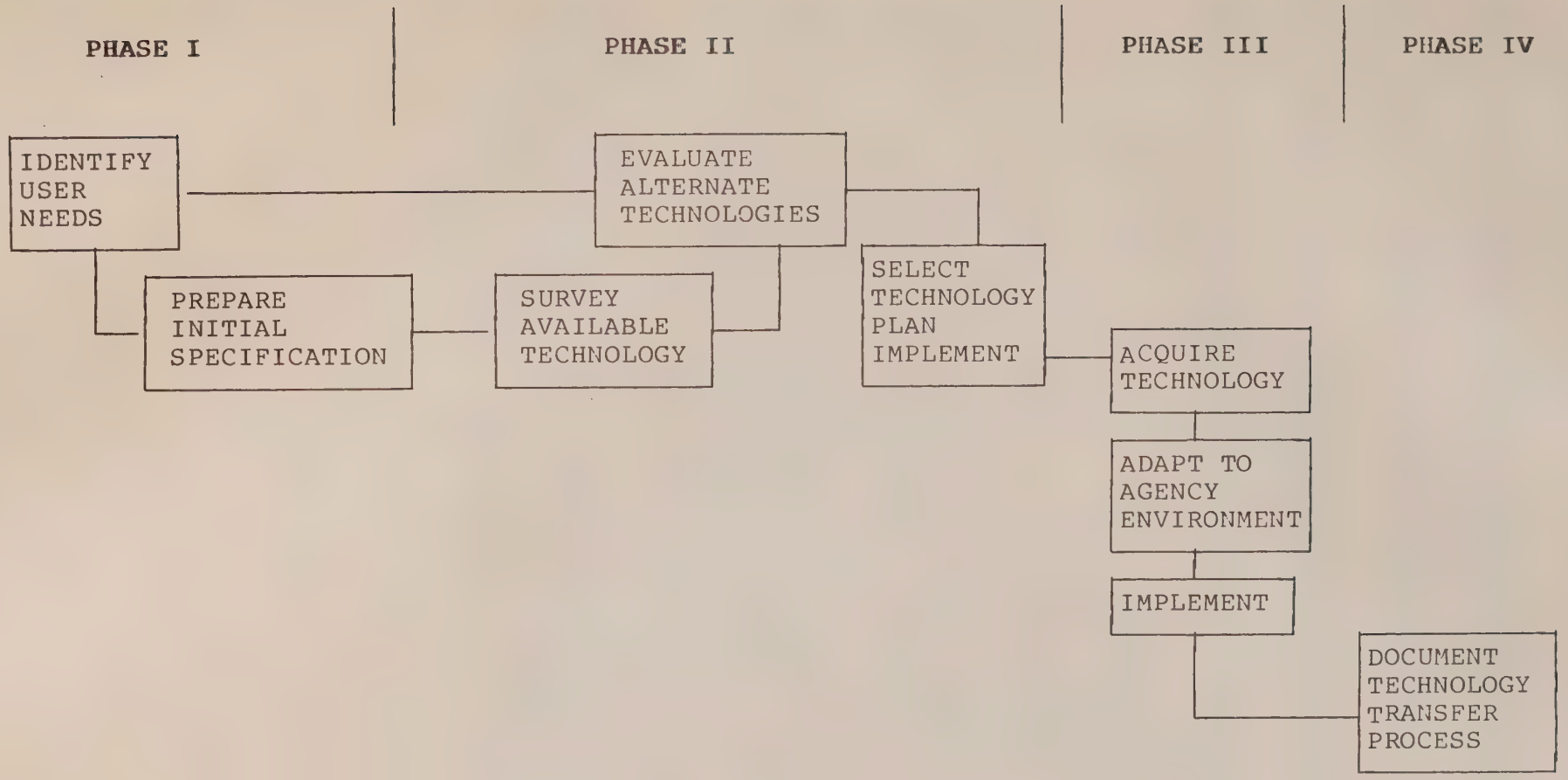


Figure 2: TECHNOLOGY TRANSFER PROJECT TASKS

A few general commandments with respect to transfer (7):

1. Never be the first recipient of the technology unless you wish to share in the final debugging, testing and shakedown.

2. Do not adopt revolutionary technology without a backup or fall-back position.

3. Never accept technology unless you are prepared to fully test and evaluate it.

4. Treat the transferred technology as if it is your own because in case of problems it will be regarded as such.

3.5 Cost - Benefit Analysis

3.5.1 Introduction

In developing a MIS there are several steps at which an evaluation and decision must be made by management. These include review of the Master Plan (Section 2.3.10), review of the Conceptual Design (Section 2.4.6), review of detailed design (Section 2.5.4), past-implementation evaluation (Section 2.7.5), and others.

To evaluate and make decisions management must have quantitative information concerning costs and expected benefits. However, obtaining rigorous cost benefit analysis for an MIS is not easy so that it may not be attempted, or, if done, performed in such a way that the results are suspect or inconclusive.

This Section will discuss briefly what a cost-benefit analysis is, its purpose, and points to consider that should be addressed in doing one. Much of the material is adapted from the King and Schrems paper (14) which contains a more thorough and detailed discussion and this paper has a bibliography.

3.5.2 Purpose

The cost-benefit analysis can be used as:

a) A planning tool to assist in choosing among alternatives and allocating scarce resources among competing demands;

b) An auditing tool to perform evaluations or follow-up on a project;

c) A way to demonstrate "quantitative" support to politically influence a decision.

All too often the third use is the most common although if the world were made up of rational, objective people, only the first two uses would be legitimate. In any event a cost-benefit analysis which would produce information which the decision-makers can use with confidence is in itself an undertaking and for some large systems a major exercise. It will require skills in producing the analysis and in interpreting the results.

3.5.3 Characteristics of Cost-Benefit Analysis

For comparative purposes costs and benefits must be expressed in some common unit such as dollars or perhaps man-years. Costs represent the resources required to procure and operate the MIS and could represent the price of equipment, rent, salaries for developers and operators of the system. Benefits could typically represent cost savings, cost avoidance, improved operational performance and "intangibles". Intangibles may refer to improved information for decision making, better control, better service, or enhanced morale. The difficulty with intangibles is that they cannot be easily quantified and used in determining the cost-benefit ratio. Ideally they could be ignored if the tangible ones are sufficient or else the manager could judge whether they are worth the extra money necessary to make the benefits equal resources.

In considering alternatives or making a go-no go decision concerning an MIS the decision-maker will be seeking the lowest value for the cost/benefit ratio. To determine this accurately one must standardize the costs and benefits. Thus one must consider:

- present value of costs and benefits since the value of future benefits should be discounted by the current interest rate;
- inflation effects if possible;
- same time period for comparisons;
- all overhead and hidden costs;
- the effects of double counting or omitting costs;
- unrealistic predictions of costs and benefits. Costs are difficult to control and benefits difficult to achieve.

3.5.4 Conducting a Cost-Benefit Analysis

The five main steps are:

(i) Selecting an analyst to do the cost-benefit analysis. This may be from in-house personnel, consultants or from another organization.

(ii) Selecting alternatives for study. The number of these will be limited as far as possible with the risk that the best one may not even be considered.

(iii) Identifying and measuring all costs and benefits.

(iv) Comparing alternatives. Costs and benefits must be in common units.

v) Performing the analysis. This involves first selecting the decision criteria then applying the comparison.

The actual carrying out of these activities is fraught with problems in identifying all costs and benefits and in assigning quantitative values especially to the less tangible benefits. However it is a necessary exercise if decision making other than political grounds is to occur.

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APPENDIX A

NWG Methodology for Identifying Information Requirements in the Field of Justice

A1.0 Introduction

This particular methodology for determining information requirements was developed by the National Work Group on Justice Information and Statistics (NWG) during 1979. It was in response to a request to develop such an approach at the Federal Provincial Advisory Committee (FPAC) conference of January, 1979. This was felt to be a necessary and primary task in attaining better information in the field of Justice.

The methodology was developed with the following underlying principles with respect to justice information:

(a) National statistics should be a by-product of operational systems statistics;

(b) Common data definitions and concepts are necessary;

(c) Information needs must be fully defined;

(d) Local authorities must be responsible to collect and assemble their own data regarding information requirements.

The methodology to be developed was constrained by a lack of large amounts of resources for the exercise, the necessity to deal with 13 governments and a variety of organizations within each government. As a result a modular format was developed and a strategy proposed whereby the results supplied by earlier respondents could be utilized by subsequent respondents.

A2.0 Application

The methodology attempts to collect hierarchical information concerning the organization's programs. This hierarchy uses the terms program, subprogram, sub/subprogram and then identifies activites performed. For each activity it seeks to determine what information is needed. The information can be divided into constituent data elements, and for each of these,the uses for which that element is needed are recorded. In addition definitions can be given for all levels in the hierarchy as well as for information and data elements.
A series of forms (Figures 3-8) are enclosed. These forms are the vehicle which permits the responding agency to describe its program structure, activities and information needs down to the data element level. Turnaround documents are also enclosed (Figures 9-10) which permit verification of the information given and allow a subsequent respondent to build on the work of previous respondents. Directions on how to use these forms are given in Section A6.0.

A3.0 Using the Methodology

A thorough definition of requirements needs the very active participation of the potential MIS user. This participation would begin by the user completing the forms. Where there are several user areas a central group (in this case NWG) may need to consolidate and coordinate this information gathering activity. To save work one user area would begin the exercise from scratch by completing forms 01C, 01D, 02C, 02D, 03C, 03D. This information would be put into computer-readable form by the NWG then fed back to the respondent for confirmation and correction. The NWG would then furnish a second user area with turnaround documents (see Figures 8-9) containing this information. The second agency could simply indicate whether the information is applicable, available and if they agree. If they do not agree they could enter their information on the original forms. In this way the requirements of subsequent users are built up from others and the response burden is lessened.

A4.0 Analysis of Requirements

The forms allow the group analyzing requirements to code classification numbers. This would be done in a logical systematic fashion to expedite subsequent analysis.

For ease and flexibility of analysis and because of the anticipated amount of information which could be expected from this exercise of defining requirements, it may be useful to put the information into a machine-readable form. Once this is done the following operations are easily accomplished:

- manipulation (sort, merge, select) to support analysis of this information;

- production of turnaround documents from which further information may be elicited from respondents;

- updating as new information is received;

- feedback of information for confirmation;

- retrieval of information to satisfy external requests;

- determination of status of the information bank, i.e. who has reported, amount of agreement on definitions, use of data elements, structure;

- a tool to facilitate getting agreement on common terminology, concepts and definitions.

The expected results from taking this approach are:

(a) Explicit identification of information and data elements needed in the MIS;

(b) More uniform concepts and definitions. This is fostered by having one agency build on the work of another. The classification numbering can allow manipulation of information to bring together similar data elements and permit the chance to resolve inconsistencies.

(c) Identification of information which can be shared by activities. All activities which require a particular data element can be identified.

A5.0 Definitions

The forms for inputting information requirements are shown in Figures 3 to 10. The terms as used on these forms are defined below:

Program: (PGM) — A component of the justice system with specific jurisdictional responsibility (e.g. Police, Courts, Corrections).

Subprogram: (SUB PGM) — A subdivision of a program which categorizes the various services provided within the program. (e.g.PGM: Police; SUB PGM: Patrol).

Sub-Subprogram: (S/S PGM) — A further subdivision of a subprogram thus allowing for sufficient levels in the hierarchical structure to fully describe the program structure (e.g. PGM: Adult Corrections, SUB PGM: Probation; S/S PGM: Investigation).

Activity: (ACTI) — An activity is a particular form of endeavour undertaken to meet the objectives of a program, subprogram or s/subprogram. (e.g. Adult Corrections, Probation, Investigation, Presentence Reporting).

Information: (INFO) — A quantitative or qualitative factor that carries some facts or knowledge. (e.g. Socio-economic background, arrest ratio).

Data Element: (DATA) — The smallest consistuent of information (e.g. income, number of policemen, age).

Level: (LEV) — The level of the entity on the forms (classification or definition). It will have values 1 to 6 depending on whether the entity is a program (LEV=1) or a data element (LEV=6).

In addition to determining the program hierarchy to which a data element may be related, Form 3C (Figure 6) also indicates the functions or uses for which the data element is required. These functions are:

Operations: (OPER) — On a regular basis to carry out day to day functions and activities in each area of responsibility (e.g. records, documentation).

Administration: (ADMIN)	For the establishment of procedures and accounting and to implement, control and evaluate programs.
Planning: (PLAN)	For forecasting needs in areas of resources, including finances, manpower and facilities (may be dependent on policies).
Control: (CONT)	To monitor the utilization and allocation of resources. This may be considered operational management and is information which permits management to exercise its control.
Statistics Local: (ST. LOC)	For summaries of activities which are required on a regular basis to support any number of local functions such as operations, planning, control, administration and evaluation.
Statistics National: (ST. NAT)	To permit interprovincial and interterritorial comparisons. These statistics would usually be more general than Statistics Local.
Legislation:	To fulfill requirements stated in an act of legislation (e.g. Census Act requires a count of voters) or data to monitor or evaluate legislation.
Research:	By policy planners to evaluate or plan programs or by the research community to pursue research. It may be advantageous to review requests from researchers which have been received in the past.
Input: (INPUT)	By another component of the justice system for any number of functions (e.g. case tracking).
Other:	For other purposes than previously stated.

These categories may not be mutually exclusive. It is probable that some data elements will be required to provide information to support more than one function and the form, 03C, permits this to be indicated.

A6.0 Forms

A6.1 Completion of Forms 01C, 01D

Form 1C identifies the programs, subprograms, sub-subprograms and activities within a given area of the justice system such as police, adult courts, or adult corrections. Within different jurisdictions some program activities will vary as the responsibility of the organization varies. It is essential to associate definitions (Form 1D) with each program, subprogram, sub-subprogram, and activity to ensure that all responsibility areas are clearly presented, that comparisons can be made, and differences are recognized.

Sample forms (see Figures 3,4) provide a cursory illustration of one program. Probation is examined in terms of both investigation and supervision activities. This is an arbitrary breakdown, chosen only to illustrate a few of the functions of a probation system.

On example Form 01D (Figure 4) Presentence Reporting is defined according to the Canadian Criminal Code (C.C.C.) Section 662(1). Where such a definition exists in the Criminal Code, it may be preferable to reference only the C.C.C. Section 662(1). For Provincial Legislation this will also be acceptable, given that copies of the relevant legislation or section of the legislation are attached to facilitate reference.

A6.2 Forms 02C, 02D

Form 02C provides a vehicle to both inventory and define the information which is required within each activity.

Presentence Reporting, for example, may require information as illustrated on example Form 02C (Figure 5).

On Form 02D (Figure 6) the information needs are defined for Presentence Reporting to provide detail on the kinds of information required at this stage of the process.

When information requirements overlap from one activity to another it is suggested that on form 02D these be identified by assigning reference numbers to each information requirement which will occur again. When the information need does occur again simply repeat the appropriate reference number.

A6.3 Forms 03C, 03D

Form 03C serves two critical functions:

- To provide a framework for listing the data elements required to provide the information to support each activity;

- To highlight the functions or uses of the information by means of placing X's in appropriate functions (see Section A5.0).

The data element serves as the basic building block of this requirements analysis. By means of its classification it can be associated with various information and activities and be found in more than one program hierarchy. The classification will also allow similar or identical data elements to be identified and duplications in definition and nomenclature to be resolved.

A.6.4 Turnaround Documents

The turnaround documents present the information received on forms 01C, 01D, 02C, 02D, 03C, 03D in a readily readable form which allows the respondent to indicate applicability, availability or agreement with information supplied. Turnaround Document #1 (see Figure 9) is used for data elements (Form 03C) and the accompanying classification information (Forms 01C, 02C) while Turnaround Document #1 - Definitions (see Figure 10) is for displaying definitions (Forms 01D, 02D, 03D). Both documents indicate an originator from which the information was compiled and a respondent from whom additional information is being elicited.

A6.4.1 Turnaround Document #1 (Data Elements and Classification)

The title at the top of each page refers to the program-subprogram-sub-sub program with its classification code. The respondent is identified with the date at which this information was sent. The originator's date is the date at which this current information was compiled. For information purposes the respondent and originator may be the same and this document is employed in a slightly different manner. The body of the document is organized by activity and then by information then data element. This permits easy distribution to relevant parts of the organization. The first number under NWG Use is a line sequence number and the second part of the coding assigned by NWG. Indentation allows one to differentiate between activity name, information name and data element name.

The applicability (APP) and availability (AVA) columns should be filled in by the respondent with a Y (yes) or N (no). Applicability indicates if the activity, information or data element is relevant or applicable to this particular sub/subprogram. Where the respondent and originator are the same (i.e. forms being used for confirmation) the applicability column is redundant. In that case each component of the justice system could look at the information submitted by other components and answer Y or N under APP to indicate if the information is also applicable to their component. The availability (AVA) indicates if the activity, information or data element is readily available in a useful form with sufficient accuracy and timeliness for the respondent's activity's needs.

The provincial summary on applicability and availability summarize for the respondent those provinces or territories who have by this time indicated Y for APP or AVA for this activity, information or data element.

The information use functions (applicable to data elements only) refer to how the originator filled in the "uses" in form 03C. Here the originator could indicate with an X up to 10 different uses for which the data element was required. The turnaround document indicates by a list of numbers (1 to 10) which uses the originator had indicated as follows:

1.	OPER.	Operational
2.	ADMI.	Administrative
3.	PLAN.	Planning
4.	CONT.	Control
5.	ST. LOC.	Local Statistics
6.	ST. NAT.	National Statistics
7.	LEGI.	Legislative
8.	RESEA.	Research
9.	INPUT	Input to another activity
10.	OTHER	Other Uses

The respondent can indicate agreement with these by leaving them as is, add numbers showing additional uses or cross out numbers which do not apply.

If the respondent wishes to add further activities, information or data elements, this may be done using original forms 01C, 02C, 03C. The forms can also indicate the respondent's program, subprogram and s/subprogram structure.

A6.4.2 Turnaround Document #1 (Definitions)

This document provides a display of any entity reported (program, sub-program, s/sub-program, activity, information or data element) with its definition. It provides the respondent a means to confirm the information, agree or disagree with the definition and to note which provinces have accepted the definition.

As with Turnaround Document #1 (Data Elements and Classification) the title at the top of each page refers to the program, sub-program, sub/sub-program with its classification code. The respondent is identified and has the date when this information was sent. The originator's data is the date when this current information was compiled. For information and confirmation purposes the respondent and originator may be the same.

The applicability (APP) and correctness (CORR) columns should be filled in by the respondent with a Y(yes) or N(no). Applicability describes if the concept is applicable to that portion (i.e. program, activity or information) of the criminal justice system. The provincial summary indicates those provinces or territories that have accepted the term as applicable. Corrections allows the respondent to indicate if he agrees with the definition as presented. If not the respondent may submit his own definition using forms 01D, 02D or 03D (whichever is applicable). If the respondent and originator are the same (confirmation mode) errors in the definition could be altered directly on the document. The provincial summary indicates which provinces or territories agree with this definition.

Sorting of these documents permits one to list multiple definitions for the same entity with every province or territory that has responded.

It can also furnish a cross-reference if the entity is a data element or information. For data elements it will indicate by name the information and activity to which the data element belongs. For information it will indicate by name the activity to which this information is related.

The turnaround document may also indicate "previously defined" where the originator had already defined it elsewhere. If the definitions are presented in an alphabetical order within the program, the actual definition will occur followed by the same activity, information or data element name which will contain "previously defined".

FIGURE 3

DEFINITION OF INFORMATION REQUIREMENTS FPAC-NWG PROJECT # 5			Page no.
01C	CLASSIFICATION STRUCTURE - PROGRAM ELEMENTS		INPUT DOCUMENT
ORIGINATOR: ______		DATE: ______	

SEQ. NO.	PROGRAM NAME	SUB-PROGRAM NAME	S/S-PROGRAM NAME	ACTIVITY NAME	FOR NWG USE ONLY PGM.	SUB PGM.	S/S PGM.	ACTI.	LEV.

FIGURE 4

DEFINITION OF INFORMATION REQUIREMENTS
FPAC-NWG PROJECT # 5

Page no. ___

01D DEFINITION - PROGRAM ELEMENTS INPUT DOCUMENT

ORIGINATOR: _____ DATE: _____

SEQ. NO.	PROGRAM, SUB-PROGRAM, S/S-PROGRAM OR ACTIVITY NAME DEFINITION	SOURCE DOCUMENT NO.	REFERENCE NO.	FOR NWG USE ONLY				
				PGM.	SUB PGM.	S/S PGM.	ACTI.	LEV.

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FIGURE 5

A12

DEFINITION OF INFORMATION REQUIREMENTS
FPAC-NWG PROJECT # 5

Page no. ⌊__⌋

02C CLASSIFICATION STRUCTURE - INFORMATIONS

INPUT DOCUMENT

ORIGINATOR: _____ [ ] DATE: _____

SEQ. NO.	ACTIVITY NAME INFORMATION NEEDED	FOR NWG USE ONLY					
		PGM.	SUB PGM.	S/S PGM.	ACTI.	INFO.	LEV.

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FIGURE 6

DEFINITION OF INFORMATION REQUIREMENTS
FPAC-NWG PROJECT # 5

Page no. ___

02D DEFINITION OF INFORMATIONS INPUT DOCUMENT

ORIGINATOR: _____ DATE: _____

SEQ. NO.	INFORMATION NAME DEFINITION	SOURCE DOCUMENT NO.	REFERENCE NO.	FOR NWG USE ONLY					
				PGM.	SUB PGM.	S/S PGM.	ACTI.	INFO.	LEV.

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A13

FIGURE 7

DEFINITION OF INFORMATION REQUIREMENTS
FPAC-NWG PROJECT # 5

Page no. ☐☐

03C CLASSIFICATION STRUCTURE - DATA ELEMENTS INPUT DOCUMENT

ORIGINATOR: _____ ☐ DATE: _____

SEQ. NO.	INFORMATION NAME DATA ELEMENTS NAME	OPER.	ADMI.	PLAN.	CONT.	ST. LOC	ST. NAT	LEGI.	RESEA	INPUT	OTHER	FOR NWG USE ONLY PGM.	SUB PGM.	S/S PGM.	ACTI.	INFO.	DATA	LEV.

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FIGURE 8

DEFINITION OF INFORMATION REQUIREMENTS
FPAC-NWG PROJECT # 5

Page no. ⌊__⌋⌊__⌋

03D DEFINITION OF DATA ELEMENTS INPUT DOCUMENT

ORIGINATOR: _____ DATE: _____

SEQ. NO.	DATA ELEMENT NAME DEFINITION	SOURCE DOCUMENT NO.	REFERENCE NO.	FOR NWG USE ONLY						
				PGM.	SUB PGM.	S/S PGM.	ACTI.	INFO.	DATA	LEV.

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FIGURE 9

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CURRENT DATE 05/11/79 DEFINITION OF INFORMATION REQUIREMENTS PAGE: 19

PROJECT # 5

TURN AROUND DOCUMENT #01

RESPONDENT:YUKON 001160 ORIGINATOR:YUKON 001160
DATE: 25/07/79 DATE: 25/07/79

ADULT CORRECTIONS - INSTITUTIONAL - PRISON 301010

NWG USE	ACTIVITY NAME / INFORMATION NAME / DATA ELEMENT NAME	A P P	A V A	INFORMATION FUNCTIONS	PROVINCIAL SUMMARY APPLICABLE(APP)	PROVINCIAL SUMMARY AVAILABLE(AVA)
0237 0110	WORK PROGRAM (PRISON PROPERTY)	_	_			
0238 1678	PRISON REQUEST	_	_			
0239 1460	ORIGINATOR	_	_	1,2,3,4,		
0240 1860	PROJECT DESCRIPTION	_	_	1,2,3,4,		
0241 1845	PROJECT COMPLETION	_	_			
0242 0840	FINAL REPORT PROJECT	_	_	1,3,4,5,		
0243 0830	FINAL REPORT PRISONER	_	_	1,3,4,		
0244 1660	PRISON ACCEPTANCE	_	_	1,2,3,		
0245 1962	PROJECT DEVELOPMENT	_	_			
0246 1850	PROGRESS REPORT PROJECT	_	_	1,2,3,4,		
0247 1830	PROGRESS REPORT PRISONER	_	_	1,3,4,		
0248 1870	PROJECT PLANNING	_	_			
0249 1930	FUNDING	_	_	1,2,3,4,		
0250 2170	SITE INVESTIGATION	_	_	1,2,3,4,		

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FIGURE 10

CURRENT DATE 21/11/79 DEFINITION OF INFORMATION REQUIREMENTS PAGE: 2

PROJECT # 5

TURN AROUND DOCUMENT #01

RESPONDENT:YUKON 001160 ORIGINATOR:YUKON 001160
DATE: 25/07/79 DATE: 25/07/79

ADULT CORRECTIONS - INSTITUTIONAL - PRISON 301010

NWG	USE	DEFINITIONS	APP	COR	PROVINCIAL SUMMARY APPLICABLE (APP)	PROVINCIAL SUMMARY CORRECT (CORR)
0006	0180	ADMINISTRATION	-	-		
		ORGANIZATION AND OPERATION OF THE PRISON THROUGH THE USE OF APPROVED G UIDELINES.				
0007	0050	ADMINISTRATION	-	-		
		COORDINATION AND ACCOUNTABILITY OF CLOTHES, PERSONAL PROPERTY, MONIES OF THE PRISONER.				
		ADMINISTRATION (ACTIVITY)				
		PRISONER MANAGEMENT (INFORMATION)				
0008	0020	ADMISSION & RELEASE SUMMARY	-	-		
		THIS SUMMARY FORMS THE FIRST DOCUMENT OF THE CUMULATIVE CASE HISTORY. INCLUDED IN THE SUMMARY IS THE COMPILATION OF DIAGNOSTIC INFORMATION OBTAINED AT AN INITIAL CLASSIFICATION INTERVIEW SHORTLY FOLLOWING THE INMATE'S ARRIVAL AT THE PRISON. THIS INFORMATION CAN BE USED TO FORMU LATE A REALISTIC PROGRAM OF CUSTODIAL CARE AND CONSTRUCTIVE TREATMENT.				
0009	0065	ADMISSION DATA	-	-		
		INFORMATION WHICH DESCRIBES THE CURRENT OFFENCE, AND SENTENCE INFORMAT ION.				
		ADMISSION & RELEASE SUMMARY (ACTIVITY)				
0010	0070	ADMISSION MEDICAL SCREENING	-	-		
		VERBAL, AND VISUAL INSPECTION OF PRISONER FOR MENTAL, AND PHYSICAL PRO BLEMS.				
		HEALTH SERVICES (ACTIVITY)				
0011	0070	ADMISSION MEDICAL SCREENING	-	-		
		(PREVIOUSLY DEFINED).				
		HEALTH SERVICES (ACTIVITY)				
		DOCTOR'S PHYSICAL EXAMINATION (INFORMATION)				
0012	0010	ADMISSION PROCEDURE	-	-		
		A SYSTEMATIC PROCEDURE TO ADMIT A PRISONER TO THE PRISON TO PRESERVE S ECURITY, SAFE-KEEP PERSONAL PROPERTY, AND PROVIDE NEW PRISONERS WITH T HOSE OPPORTUNITIES TO ALLAY ANXIETY, MEET IMMEDIATE INDIVIDUAL NEEDS, I DENTIFY URGENT MEDICAL PROBLEMS, AND PROVIDE ORIENTATION TO THE PRISON.				

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B.0 General Overview

This reports deals with the technical documentation that should accompany any data processing system that has been completed and set up. The purpose of this documentation is to permit quick, efficient use of such processing systems by personnel who are properly qualified, but have not taken part in their development.

This report is derived from the documentation standards currently used by Statistics Canada, and is divided into three sections: - systems documentation on the systems themselves, data documentation, - operations documentation.

Section B4.0 deals with the procedures to be followed in transferring systems from one facility to another.

B1.0 Systems Documentation

B1.1 System Overview

A description of the purpose and characteristics of the system, including:

- purpose,
- general functions,
- present users,
- description of inputs,
- description of outputs,
- agency responsible for development.

B1.2 General System Technical Description

- language(s) used,
- software requirements,
- computers,
- terminals,
- number and size of programs and files,
- management software usage,
- access methods,
- data security methods,
- protection and restarting procedures in case of failure.

B1.3 Detailed System Design Description

Description of the technical design and methodology of the system:

B1.3.1 System Component Specifications

- overall purpose of subsystems and modules,
- structure and interaction of subsystems and modules (flowchart),
- method chosen,
- terminology, standards and conventions,
- denomination of inputs and outputs,
- limits and constraints of different entities.

B1.3.2 Job Stream Specifications

B1.3.3 Individual Program Specifications

- purpose,
- program characteristics,
- input and output identification,
- identification of utilities.

B1.3.4 Cross-reference Index of Programs, Jobs, etc.

B1.4 Program Descriptions

Processing programs must be described as follows:

- main program functions,
- environment such as operating system, language used, etc,
- Control parameters such as: "PARM" control card parameters,
- indication of input and output files used,
- processing flowchart,
- description of decision tables, pseudo-codes, etc,
- the program itself, with structure and notes to facilitate understanding,
- list of conventions used for variables.

B1.5 Methodology

The theoretical approach to system design should usually be laid out and explained. For example, for a model of population flow through a given system (court, prison, etc.), the selected approach should be specified (eg. offender based).

B2.0 Data Documentation

It is indispensable to have separate documentation for data produced and/or handled by the system, particularly in the case of information systems. This documentation consists of:

- definition of data concepts,
- file descriptions,
- record descriptions,
- coding schemes,
- data set descriptions,
- report and file/item cross-reference.

B2.1 Definition of Data Concepts

This includes the description of data-represented entities, logical groupings of data and their properties.

B2.2 File Descriptions

These descriptions include:

- reference name,
- general statement of file content,
- summary description of file records and relationships between records,
- relationships between files,
- reference names of key fields, sort keys and record type indicators,
- type of file organization,
- file sequence.

B2.3 Record Descriptions

These include:

- reference name,
- list of reference names,
- position of each item in the record,
- format of each item, with the convention used (i.e. COBOL or PLI),
- for coded items, a coding scheme reference and, if applicable, the value corresponding to the codes,
- brief description of items having names that are not self-explanatory.

B2.4 Coding Scheme

The corresponding value should be given for each code.

B2.5 Data Set Descriptions

These contain all information required for access to and use of the data contained in the data set.

They include:
- data set name (DSN),
- volume serial number,
- name of file to which the data set belongs,
- brief description of content,
- creation date.

B2.6 Report and File/Item Cross-Reference

This cross-reference provides a means of locating any item, file or report at any given time.

It usually consists of a computerized list of the various items, files and reports.

B3.0 Operations Documentation

B3.1 Operations Manual

The Operations Manual is intended for the personnel operating the system. It should contain:
- table of contents,
- system overview,
- system flowchart,
- production workflow,
- jobstream description,
- list of catalogued procedures,
- operation environment,
- data set management guide,
- sample documents,
- message list,
- file descriptions,
- record descriptions,
- coding scheme.

B3.2 User's Guide

This guide contains the documents required by the end user of the system. In particular it should contain the following:
- table of contents,
- system overview,
- system flowchart,
- production workflow,
- operation environment,
- data concepts,
- file descriptions,
- data set management guide,
- message list,
- language reference guide,
- methodology,
- detailed system specifications.

B3.3 System Flowchart

This flowchart is a graphic representation of the processing system. It describes all major manual and mechanical functions of the system.

This representation consists of flowcharts diagramming the functional relationships of the system from the top down, i.e. from the highest aggregate level down to the lowest level, which is usually a single phase in one of the processing programs.

B3.4 Production Workflow

This workflow specifies the nature and order of the actions required to run the system. It is generally prepared for each level of interaction with the system. A production workflow will include:

- production scheduling,
- file handling procedures,
- manual and clerical procedures,
- job submission procedures,
- time sharing type commands and symbolic parameters for control cards.

Time sharing commands, will be described, as will the symbolic parameters if they are used on control cards.

B3.5 Jobstream Description

Each of the operator's activities on the computer should be described in clear, non-technical terms. The description will include:

- purpose of activity,
- relationships to other procedures,
- limits or constraints applying to the activity,
- frequency of the event,
- function of each procedure,
- input descriptions (control cards, files, tables),
- output descriptions,
- list of prerequisites before running the job.

B3.6 Catalogued Procedures

Catalogued procedures are used to obtain more rational and efficient control card organization. They include:

- at the beginning of each procedure, a comment block containing the name and function of each procedure and a list of parameters used, such as keywords and default values

- after each "EXEC" card, a description of the functions of the step.

B3.7 Operation Environment Description

The purpose of this section is to describe the hardware, software and human resources required to run the system. It will include descriptions of the following:

- hardware,
- software (list of application programs or packages such as EXTRACTO),
- personnel skills required to run the system,
- some elements of accounting data (CPU cost, disk use, etc.),
- decision-making points and communication lines to be followed during production,
- policies relating specifically to that application.

B3.8 Data Set Management Guide

This guide contains data set control procedures. It usually contains:

- general data set organization,
- data retention periods,
- data and data set naming conventions,
- data support media (paper, tape, disk, etc.),
- the name of the Data Set Manager.

B3.9 Message List

The user should be supplied with the list of messages from the application program(s). This list usually includes:

- the message as produced by the machine,
- an explanation of its circumstances and implications.

These messages inform the user of the processing result and some operating parameters (record numbers). Messages of time sharing origin may also be included. Messages from the operating system are generally not included.

B3.10 Language Reference Guide

This guide describes how to use parametric type languages, (i.e. high level languages only requiring certain operating parameters). This guide will include:

- brief language summary,
- detailed description of syntax and semantics (language architecture, notation, syntax and definition of terms),
- message list,
- concrete operating examples,
- limits and constraints of the language and some considerations regarding its performance.

B3.11 Training Manual

A training manual may be necessary in the case of a highly complex system or when a large number of persons are likely to be using the system. A training manual generally requires re-arrangement of documentation materials for teaching purposes.

B3.12 Problem Notice

Separate problem notices should be established to describe difficulties encountered during the installation and start-up of a system and offer possible solutions. Solutions should be recorded when implemented.

B3.13 Sample Documents

All documents such as questionnaires, waybills, input-output documents, control documents, should be attached to the main documentation.

B4.0 System Transfer Procedures

Although transfer procedures are not included in any standard system documentation, a fully developed system may, in many cases, have to be transferred to another facility that may not have the same operation environment (equipment, operating system, etc.).

In such cases, the agency that developed the system will have to provide additional information to facilitate the transfer. This information may include:

- Indication of human resources required to set up and run the system;
- Indication of software requirements such as size of central storage, type of computer, software and languages required;
- Indication of the time required to start the system;
- Probable installation costs;
- System operating costs;
- Required or probable modifications;
- System evaluation procedures.

COMMENT SHEET

Your comments on any aspect of this document are welcome. Please send them to:

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